

towards termen and inner margin; the ground-colour between it and the inner margin brownish, paler than the rest of wing. Hind wing similar to that of *catana*, but uniformly blackish, except a narrow brown anal area.

Below.—Still darker than above. Fore wing: discal pale area similar to that of *catana*, but not so large, scarcely entering into cell, reaching proximal half of vein 3, rounded costally, remaining some 3 mm. from termen, reaching inner margin. Hind wing: faint traces of the blue circumcellular spots.

1 ♂, Merauke, 1912 (*Rev. J. Viegen, M.S.C.*).

It is interesting to note the resemblance in the darkening process which exists between this new form and the Merauke race of *Euplœa alecto*, Butl. (*cf. Ann. & Mag. Nat. Hist.* (9) xi. p. 182, 1923).

LXXII.—*New Species of Crane-flies collected by Mr. G. V. Hudson in New Zealand.* By F. W. EDWARDS.

(Published by permission of the Trustees of the British Museum.)

THE seven new crane-flies described below were included in a very interesting collection received from Mr. Hudson in the spring of 1922, and form a very valuable addition to the already extensive series previously presented by him to the National Collection, besides furnishing additional evidence of the extensive and varied crane-fly fauna of New Zealand. The forms here described appear distinct from all those recently made known by Alexander, and bring the total number of New Zealand species to just about 300.

Tanyderus marginatus, sp. n.

Head heavily dusted with light ochreous, and clothed with long brown hair. Proboscis and palpi dark brown, the former nearly twice as long as the head and rather longer than the neck. Eyes almost but not quite touching above the antennæ. Antennæ with the scape dark brown; flagellum light brown, the segments all cylindrical, practically equal in length, and with rather inconspicuous pubescence, which is scarcely as long as the diameter of the segments (in *T. annuliferus* it is distinctly longer). Neck long and slender, dark brown. *Thorax*: pronotum dark brown in the middle, ochreous at the sides. Mesonotum with the ground-colour light grey, the three brown stripes just separated, long but inconspicuous brown hair along the interspaces. Scutellum

darkened in the middle. Pleura with obscure brown mottling, a rather conspicuous dark spot on the sternopleura. *Abdomen* dark brown dorsally, each of tergites 2-6 with a rather narrow oblique white mark on each side, commencing from the basal corner and extending a little over half the length of the segment; tergites 1 and 7 with a somewhat similar but more ochreous mark. Hypopygium dark brown, constructed as in the other New Zealand species. *Legs* yellowish, the tips of the femora, tibiae, and tarsal segments dark brown, most conspicuous on the femora. Hair rather long and conspicuous, about twice as long as the diameter of the segments. *Wings* with the ground-colour whitish, except in cells *C* and *Sc*, where it is more ochreous, the greater part of the surface covered by the dark brown markings; veins yellowish, darker in most of the dark areas, all except *Sc*, *An*, and the cross-veins clothed with rather conspicuous macrotrichia. Markings much as in *T. forcipatus*, O.-S., but the borders of all the large spots are darkened, and in many places traces of the white ground-colour show between the spots and the dark borders.

Venation: the two accessory cross-veins separated by less than the length of one of them, both placed well beyond the fork of R_{2+3} . Cross-vein *m* angulated, each half about as long as the basal section of M_2 . Cell M_2 not much wider at the margin than cell M_3 . Halteres pale basally, knob dark brown.

Length of body 15 mm.; wing 17×5 mm.; front leg 33 mm.

North Island: in dense forest, ravine below reservoir, Wainui-o-mata, Wellington, 15. xii. 1920 (*G. V. Hudson*).

Type ♂ (unique) in Mr. Hudson's collection.

Amphineurus subglaber, sp. n.

Closely related to *A. horni*, Edw., differing as follows:—Wings rather broader and with a slight yellowish tinge; macrotrichia on membrane very few and scattered, quite absent from the greater part of the wing. Hypopygium: ninth tergite with the apical lobes short, divergent, not blackened. Side-pieces with two pairs of terminal processes (apart from the appendages), which are equal in length and about twice as long as the side-piece itself; the outer process hairy, of the usual form, the inner one (produced from the ventro-apical angle) bare, blade-like, somewhat expanded before the tip, which is acuminate. One pair of appendages short, bent inwards at the middle, the outer half blackened; the other pair long, basal half swollen, black, the outer third

or half slender, pale. Parameres long and black, with a small outward-facing tooth some distance before the tip. Penis long and sinuous.

Length of body about 4 mm.; antenna about 6.5 mm.; wing 6×1.5 mm.

North Island: Wilton's Bush, Wellington, xi. 1921 (*G. V. Hudson*, no. 378).

Type ♂ and one paratype ♂ in the British Museum.

Amphineurus niveinervis, sp. n.

Nearly allied to *A. fatuus*, Hutton, and *A. subfatuus*, Alex., but differing as follows:—Front and mid-femora without any trace of a pale ring; the ring on the hind femora broad, well defined on its inner edge, but gradually fading outwardly. Wing-markings as in *A. subfatuus*, but very indistinct. Veins all dark except round the tip of cell *R*, where they are snow-white. Venation as in *A. fatuus*, except that *Cu₁a* is less oblique and is equal in length to the stem of cell *M₃*.

Length of body 5 mm.; wing 6 mm.

North Island: Wilton's Bush, Wellington, xi. 1921 (*G. V. Hudson*, no. 351).

Type ♀ in the British Museum.

Limnophila strigimacula, sp. n.

Nearly allied to *L. marshalli*, Hutton, differing as follows:—Antennæ distinctly shorter, the flagellar segments barely four times as long as their greatest breadth; first flagellar segment ochreous, slightly darkened at the base, the remainder with the basal half blackish, the apical half ochreous, rather obscurely so on the terminal segments. Postnotum without the black median patch characteristic of *L. marshalli*. Hypopygium much as in *L. marshalli*, particularly as regards the form of the ninth tergite and claspers, but the horny dorso-basal appendage of the side-pieces is stouter and simple (not forked), the membranous flap on the inner ventral face of the side-piece is much larger, and there are, in addition, a pair of straight, pubescent, square-ended, strap-shaped, ventral appendages, which are absent in *L. marshalli*, though present in a very similar form in *L. cyatheti*, Edw. Wings with markings on much the same plan as in *L. marshalli*, but the spots smaller and the ground-colour of the wings more clouded, especially in the male; spot over base of *R*s irregular in shape, those over the tip of *An* and *Ax* in the form of hollow rings; the spot in cell *M* in the form of an elongate

dark streak ; another shorter dark streak in cell R . Sc_2 scarcely three times its length distant from the tip of R_1 and beyond the base of R_2 ; basal section of R_{4+5} oblique ; $Cu_{1\alpha}$ well before middle of discal cell.

North Island : Karori, Wellington (*G. V. Hudson*, no. 346).

Type ♂ and allotype ♀ in the British Museum.

This species is of interest, since it obviously connects *L. marshalli* with *L. cyatheti*. The venation, except for the position of $Cu_{1\alpha}$, is practically as in the latter species, and the relationship is also shown by the coloration of the antennæ.

Gynoplistia orophila, sp. n.

♂. *Head* black, somewhat shining, but very distinctly dusted over with grey. Front broad, slightly broader than one eye. *Antennæ* black, 16-segmented, last five segments simple, the appendages of the intermediate segments about six times as long as the segments. *Palpi* black. *Thorax* shining black, the pronotum, the front of the præscutum, and the posterior lateral corners of the scutum reddish. *Pleura* with some rather inconspicuous grey hair. *Abdomen* shining black, the hypopygium bright orange. Ninth tergite with a rather long median projection, provided with a small tooth on each side at the base. Side-pieces with a rather long ventro-basal thumb and a broad ventro-apical plate-like expansion, and on the inner face with some rather dense orange hair. Inner clasper with the broad tip bent and twisted. *Parameres* bifid, the longer branch reaching tip of side-piece. *Legs* black ; coxæ, trochanters, and about the basal halves of the femora orange. Hind femora rather strongly clubbed. Tibial spurs normal. *Wings* much resembling *G. nigronitida*, Edw.; in venation and pattern, but the spot at the base of the basal cells is only faintly indicated, while the wing-tip is much more conspicuously darkened. Halteres with ochreous stem and black knob.

♀. *Antennæ* 16-segmented ; the ventral enlargement of the first eight flagellar segments about equal in length to the diameter of the segment. Præscutum, scutum, and scutellum mainly reddish, also the sternopleura. Femora rather more extensively orange ; tibiæ brownish, with black tips ; tarsi largely brown. Otherwise as in the male.

Length of body, ♂ 6, ♀ 8.5 mm. ; wing, ♂ 7, ♀ 8 mm.

North Island : Whakapapa, Mt. Ruapehu, 4000 ft., Jan. 1922 (*G. V. Hudson*, no. 406).

Type ♂, allotype ♀, and paratype ♀ in the British Museum.

This seems nearly allied to *G. aurantiopyga*, Alex., differing in the orange coxæ and details of hypopygial structure.

Macromastix bivittata, sp. n.

♂. *Head* mostly clear light ochreous, but with a rather broad dark brown band on the vertex, connecting the eyes, and angularly produced forwards in the middle, where it is interrupted by a narrow pale longitudinal line. Front at its narrowest part equal in breadth to one eye. Frontal tubercle moderately large and rather deeply bifid. Rostrum ochreous, scarcely as long as the vertical diameter of the head; nasus hardly distinguishable. Antennæ short, hardly more than half as long as the thorax. First scapal segment ochreous, second a little darkened; flagellum wholly black, the ten distinct segments all approximately cylindrical and equal in length. Palpi black. *Thorax* practically bare, the integument dull, except the middle and posterior part of the præscutum, which is somewhat shining. Prothorax entirely ochreous. Præscutum with the ground-colour greyish ochreous in the middle, brownish at the sides, but mostly occupied by *four* distinct blackish-brown stripes, the outer pair a little more intense and continued across the scutum. Scutellum dull ochreous. Postnotum ochreous, the lateral and posterior margins rather broadly dark brown. Pleura ochreous; an ill-defined dark stripe along the anterior border of the mesepisternum, and another much fainter stripe along the posterior border of this part. *Abdomen* short, deep ochreous, almost orange; a pair of irregular sublateral blackish stripes extending the whole length; seventh tergite greyish, eighth black; hypopygium small, inverted, dull ochreous. *Legs* almost uniformly brownish, except for the ochreous coxæ and trochanters. *Wings* clear; stigma and subcostal (not costal) cell dark brown; veins dark. *Rs* almost as long as *R* and more than twice as long as R_{2+3} , which is rather strongly arched at the base; *r* present, joining R_2 near its base; petiole of cell M_1 about one-third as long as the cell; cell *Ax* rather broad (as in *M. tenera*). Halteres dark.

♀. Resembles the ♂, except that the apical flagellar segments are thinner and less distinctly separated and the tarsi are a little shorter.

Length of body 7–8 mm.; wing 12–13 mm.; hind tarsus, ♂ 18, ♀ 13 mm.

North Island: Waimarino and Kaitoke (*G. V. Hudson*, no. 374).

Type ♂, allotype ♀, and paratypes ♂ ♀ in the British Museum.

The only other New Zealand species with the type of abdominal markings found in this interesting new form are *M. tenera* (Hutton) and *M. pseudotenera*, Alex. With the latter of these *M. bivittata* agrees in most respects, but differs in its shorter antennæ and longer *Rs*. From *tenera* it differs obviously in the dark marking on the head, four præscutal stripes, markings of postnotum, etc.

Macromastix elongata, sp. n.

Head almost uniformly orange-brown, slightly dusted with grey at the sides behind the eyes. Pubescence fine and pale. Front not much more than half as broad as one eye. Frontal tubercle rather large, slightly but distinctly bifid at the tip. Rostrum about as long as the head, orange-brown, somewhat darker beneath. Nasus long, clothed with conspicuous long golden hair. Antennæ with the scape ochreous, flagellum black; first six flagellar segments distinct and equal in length, though decreasing slightly in diameter, the terminal four segments very slender and indistinctly separated. *Thorax*: pronotum dark brown at the sides, greenish brown in the middle, pale posteriorly. Mesonotum with scarcely perceptible pubescence, ground-colour dull greenish. Præscutum with four brown stripes, the margins of which are darkened, middle pair of stripes almost contiguous. Scutum with two broad brown stripes. A blackish spot in the middle of the suture. Scutellum brown, sides narrowly greenish. Postnotum and pleura dark brown, heavily dusted with grey, the pleura with two ill-defined almost black spots. *Abdomen* rather elongate, dark brown, somewhat shining, the posterior and lateral margins of the tergites narrowly pale. Ovipositor long, but fleshy and hairy as in the genus. *Legs* very long, coxæ coloured as pleura, remainder of legs uniformly rather dark ochreous. *Wings* very slightly milky, cells *C* and *Sc* orange-brown, stigma rather elongate, blackish, with a very small pale spot at each end, veins brown. Venation: *Rs* short and straight, a little shorter than R_{2+3} . R_2 oblique, almost continuing the direction of R_{2+3} and nearly half as long as this vein. Petiole of cell M_1 rather shorter than *m*; *m-cu* obliterated; cell *Ax* rather broad. Halteres with dark stem and greenish knob.

Length of body 25 mm.; wing 25×5.5 mm.; hind femur 13.5 mm.; hind tibia 15 mm.; hind tarsus 22 mm.

Type ♀ (unique) in Mr. Hudson's collection.

North Island: Mt. Ruapehu, in swamp at edge of forest

near Whakapapa Cottage, 3700 ft., 9. i. 1922 (*Miss S. Hudson*).

Although this differs in general appearance from most species of *Macromastix*, and rather strongly suggests a species of *Holorusia*, the fleshy ovipositor and the absence of a spur in cell *M* show that it has no close connection with *H. novaræ* and allied species. On the other hand, it shows considerable affinity with the species of the *viridis* group of *Macromastix*, and seems to have a near ally in *M. angusticosta*, Alex., which has no nasus, femora with black tips, etc.

LXXIII.—*On the Larva, Pupa, and Systematic Position of Orphnephila testacea, Macq. (Diptera Nematocera).* By L. G. SAUNDERS, M.Sc. (McGill), 1851 Research Student*.

[Plates VII. & VIII.]

CONTENTS.	Page
History	631
Habits of Larva and Pupa	632
Description of Larva	632
Description of Pupa	637
Systematic Position	638
Summary	639
Acknowledgements	639
References	639
Explanation of the Plates	640

HISTORY.

THE adults of *Orphnephila* have long been known in Europe, from Lappland and Norway to Italy; one species, *O. testacea*, occurs sparingly in the United States, and very recently a number of species have been discovered in New Zealand and Tasmania. Prior to the discovery of the early stages, a special family, Orphnephilidæ, was erected to accommodate this embarrassing genus, which would not conform to the specifications of any family among the Nematocera; Macquart, Meigen, and Kieffer agreed in placing it between the Mycetophilids and the Cecidomyiids.

In 1909 Thienemann found the larvæ and pupæ of *O. testacea* living in small streams and brooks, where the water runs very thinly over smooth rocks. When appealed to, Kieffer at once pronounced that this was a Chironomid, and the group was made the first subfamily of the Chironomidæ, with the Ceratopogoninæ second. This information was published by Thienemann (1909) with a brief description

* From the Molteno Institute for Research in Parasitology, University of Cambridge.